Consumers' expectations about nutrition guidance: the importance of primary care physicians[1–3]

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ABSTRACT To clarify the role of the primary care physician (PCP) in providing nutrition information to the public, we investigated in a random sample of Dutch consumers their referral to 11 nutrition information sources including the PCP, their perceived expertise of these sources, their interest in nutrition information, and their nutritional attitudes and beliefs. Factor analysis over these 11 sources of nutrition information resulted in two factors: noncommercial sources ($\alpha = 0.70$) and commercial sources ($\alpha = 0.78$). Respondents' referral to and perceived expertise on a five-point scale of noncommercial sources was higher than for commercial sources [respectively, 54% compared with 21%, $P < 0.0001$, and 3.9 ± 0.6 compared with 2.7 ± 0.6 ($\bar{x} \pm$ SD), $P < 0.01$]. The individual Spearman correlation coefficient between referral scores and perceived expertise was $\rho = 0.35 \pm 0.36$ ($\bar{x} \pm$ SD). For most sources, referral to that source was dependent on a higher interest in information about a healthy diet and on perceived expertise of the source. There were three leading noncommercial sources: the PCP, the dietitian, and the Netherlands Food and Nutrition Education Bureau (FNEB). Careful analysis revealed that because of their high referral scores, high perceived expertise, and reach to nearly all segments of the population, PCPs are in a unique position compared with dietitians and the FNEB. *Am J Clin Nutr* 1997;65(suppl):1974S–9S.

KEY WORDS Primary care physician, dietitian, nutrition information, referral score, perceived expertise, Netherlands, factor analysis

INTRODUCTION

Physicians are perceived as the best source of health information, the most credible source, and, after the media, the source most often used (1–5). Primary care physicians (PCPs) can potentially play a key role in providing nutrition information (4). In 1 y ≈70% of patients visit the doctor at least once; in 3 y time this figure is 90–95% (5). In 14–28% of consultations, diet comes up for discussion (3, 6, 7), the initiative being evenly divided between PCP and patient (6).

PCPs probably do not make sufficient use of the opportunities for health education about nutrition in their consultations (8, 9). This is regrettable because there is increasing evidence that a significant part of quality of life depends on adequate food and nutrition practices (10). PCPs are not aware of the extent to which patients value lifestyle advice (11) and underestimate the interest of patients in receiving health education (12). Patients are of the opinion that PCPs should show more interest in their lifestyle (13, 14).

Most research has been directed toward the medical profession as such and their involvement in nutrition information activities. We describe the findings of a study in consumers of the medical services, their referral to 11 nutrition information sources, their perceived expertise of these sources, their interest in nutrition information, and their nutritional attitudes and beliefs. Specific attention is given to the position and role of PCPs as a source of expertise in nutrition.

METHODS

In March 1991 a telephone survey was carried out among a random sample (on the basis of all telephone numbers in the Netherlands) of Dutch consumers aged 18–80 y and living in a household in which cooking is done four or more times a week. All interview staff of the market research bureau were trained with written instructions and a training diskette. To avoid selectivity, interviews were organized in the morning, afternoon, and evening. The interviews were carried out with a computer-aided structured questionnaire with predominantly closed questions.

The questions were divided into four categories. The first category consisted of questions measuring referral to 11 sources of nutrition information (asking for information from different individuals and institutions; respondents answer yes or no). The second category consisted of questions measuring the perceived expertise of these 11 nutrition information sources on a five-point Likert scale (15). The third category consisted of sociodemographic characteristics of the respondents: sex, age, level of education, level of income, and having children living at home (yes or no). The fourth category assessed nutritional attitudes, perceived knowledge, and behavior by measuring perceived importance of contribution of diet to

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health (four-point scale), perceived wholesomeness of own diet (four-point scale), attitude on role of diet in coronary artery disease (four-point scale), attitude on weight-health relation (five-point scale), extent of interest in information about a healthy diet (four-point scale), perceived own level of general nutrition knowledge (four-point scale), and number of self-cooked meals a week (0, 1–3, or 4–7). Attitudinal questions were scored either on a five-point Likert scale or on a four-point scale (to force decisions).

The analysis was carried out with SPSS (16). Nutrition information sources were grouped by means of a principal components analysis with varimax rotation (factor analysis) on the basis of the question on perceived expertise of the sources. Crohnbach's α was used as a measurement of reliability of scales derived from factor analysis. Factors were calculated as sums of items, standardized for scale width. Differences between the percentage of consumers referring to different sources were tested with the McNemar test. Relations between variables were tested with Pearson correlations. Differences in perceived expertise of the nutrition information sources were tested with paired *t* tests. Relations between perceived expertise of a source and referral to that source were tested with Spearman correlations. Characteristics of consumers that influence the use of a certain nutrition information source or a group of nutrition information sources were analyzed in two different ways: univariate analysis (with *t* test) and with multivariate logistic regression (which intrinsically corrects for confounding factors, if present) (16).

RESULTS

Response, characteristics, and background of respondents

Of 1200 persons in the sample, 628 responded (52%); 5 respondents were excluded from the analyses because of unusable answers. Twenty percent refused to cooperate in the survey; because of language reasons no communication was possible with 1% and 27% could not be contacted after two retries. Therefore, the net response rate was 53%. Female respondents were overrepresented (57% females, 43% males), probably because in general, women are more often at home than men (**Table 1**). Compared with the Dutch population aged 18–80 y as a whole, the age group of 18–29 y was somewhat underrepresented in our sample (18% compared with 22.5%; probably because most persons of this age live in a one- or two-person household, which makes them more difficult to contact by phone) (17). Additionally, persons with a higher level of education were somewhat overrepresented (22% compared with 15.6%) (17), which is the result of their higher interest in the subject (Table 1).

On the basis of the social exchange theory (18), it was anticipated that many factors would influence the decision to respond to the survey, the extent of interest in the subject being one of the most important. In general, interest in a topic is also an important factor determining whether someone asks for information on that topic (18). Sixty-six percent of the respondents were interested or very interested in information about a healthy diet (Table 1). Women were more interested than men ($P \leq 0.001$). All age groups had about the same interest in information about a healthy diet. The group with a high level of education was more interested in information on a healthy diet than were the groups with low and average levels of education ($P < 0.05$).

TABLE 1
Characteristics, nutritional attitudes, and beliefs of 623 respondents to a telephone survey

Characteristic	Percentage
	%
Sex	
Male	43
Female	57
Age group	
18–29 y	18
30–39 y	24
40–49 y	20
50–64 y	22
65–80 y	17
Level of education	
Low	32
Middle	46
High	22
Extent of interest in information about a healthy diet	
Not interested	8
Moderately interested	26
Interested	49
Very interested	17

Perceived expertise of nutrition information sources

As reported earlier from this telephone market research survey (4), PCPs, friends and neighbors, and family had the highest referral scores as nutrition information sources (36%, 36%, and 35% of respondents use these sources, respectively). These three sources had significantly higher referral scores than did dietitians (21%) or the Netherlands Food and Nutrition Education Bureau (FNEB; 17%) ($P \leq 0.05$). Seventy-one percent of respondents used at least one source; 54% of respondents used one to four different sources. In this article, we include and discuss only the 11 nutrition information sources shown in **Table 2**, which were included in the questionnaire. Friends and neighbors and family are excluded because they cannot serve as an intermediary group to inform the consumer: they are comparable with consumers (19).

Table 2 shows the referral score and the mean level of perceived expertise of the different nutrition information sources in the present study. Dietitians and the FNEB had the highest perceived expertise, followed by PCPs. However, although significant ($P \leq 0.0001$), the differences in perceived expertise between PCPs and the group of dietitians, FNEB, consumer organizations, district nurses, health food shop personnel, and pharmacists was not large. On the other hand, by far the highest referral score was for PCPs. The differences in perceived expertise of PCPs compared with druggists, greengrocers, butchers, and bakers were, in contrast, both highly significant and large.

For all the sources in Table 2, there was a relation between perceived expertise of the source and referral score (concordance), with Spearman's ρ ranging from 0.16 (druggist) to 0.35 (consumer organizations). Respondents who referred to a certain source compared with respondents who did not refer to that same source had a higher perceived expertise of that source ($P \leq 0.001$), and this was true for all sources. The individual

TABLE 2
Referral score and perceived expertise of the 11 sources of nutrition information[1]

Source of nutrition information	Referral score	Mean level of perceived expertise[2]	Concordance: Spearman's ρ[3]
	%		
1) Dietitian	21	4.3 ± 0.9	0.25
2) Food and Nutrition Education Bureau	17	4.3 ± 0.9	0.25
3) Primary care physician	36	3.9 ± 1.1	0.20
4) Consumer organizations	12	3.7 ± 1.0	0.35
5) District nurse	13	3.5 ± 0.9	0.34
6) Health food shop personnel	15	3.4 ± 1.0	0.25
7) Pharmacist	11	3.4 ± 1.0	0.30
8) Druggist	11	2.9 ± 1.0	0.16
9) Greengrocer	9	2.7 ± 1.0	0.28
10) Butcher	11	2.7 ± 1.0	0.26
11) Baker	5	2.6 ± 0.9	0.25

[1] n = 623 respondents to a telephone survey.
[2] Five-point scale: 1 = no expertise to 5 = very high expertise; $\bar{x}$ ± SD.
[3] All concordance values were significant, $P < 0.01$.

Spearman correlations between referral score and perceived expertise were calculated for all respondents (n = 328). Fifty-two respondents who perceived no variance in expertise of the 11 sources and 243 respondents who did not refer to any of the 11 sources were excluded from the analysis. The mean individual Spearman correlation coefficient was $\rho = 0.35$ (SD = 0.36). The coefficient between mean referral score per source and mean perceived expertise of that source was $\rho = 0.90$ (P = 0.001, n = 11).

Factor analysis on nutrition information sources

The 11 sources of nutrition information were entered into the factor analysis. The analysis was carried out on the basis of the question on perceived expertise of the sources. Two factors were extracted. High positive factor loadings (> 0.55) on factor 1 were found for butcher, greengrocer, baker, and druggist. These sources can be characterized as commercial nutrition information sources (Crohnbach's α = 0.78). High positive factor loadings (≥ 0.55) on factor 2 were found for PCP, FNEB, dietitian, consumer organization, and district nurse. These sources can be characterized as noncommercial sources (Crohnbach's α = 0.70). The factor loadings of the pharmacist and health food shop personnel on both factors were positive, but ≤ 0.45. These sources have both commercial and noncommercial characters.

A respondent has a referral score on the factor noncommercial or commercial sources when he or she uses at least one of the constituting sources of the factor. Noncommercial sources are referred to more by respondents than are commercial sources: 54% compared with 21% ($P < 0.0001$). The mean perceived expertise (score 1–5; ± SD) of noncommercial sources (3.9 ± 0.6) was significantly higher than that of commercial sources (2.7 ± 0.6) ($P < 0.01$). For both noncommercial and commercial sources, the perceived expertise of respondents who referred to them was significantly higher than the perceived expertise of respondents who did not refer to these sources ($P < 0.01$).

Noncommercial sources

In our search for determinants of referral to noncommercial sources, we carried out a univariate analysis (t test) as well as a multivariate analysis (logistic regression) to correct for possible confounding factors. The variables in **Table 3** were entered as possible determinants in the univariate analysis as well as in the logistic regression. In the univariate analysis it was found (Table 3) that many variables act as determinants of referral to noncommercial sources. However, in the logistic-regression analysis it was found (Table 3) that noncommercial sources of nutrition information were referred to more by persons with children living at home, persons with a more positive attitude on the role of diet in coronary artery disease, or persons with a more positive attitude on the relation between weight and health or with a higher interest in information about a healthy diet or both. Perceived expertise of the source was not a determinant, possibly because the variance in level of perceived expertise of noncommercial sources was small.

Commercial sources

In our search for determinants of referral to commercial sources, we also carried out a univariate analysis as well as a multivariate analysis (logistic regression). In the univariate analysis it was found (Table 3) that many variables act as determinant of referral to commercial sources. However, in the logistic regression analysis it was found (Table 3) that commercial sources of nutrition information were referred to more by people with a more positive attitude on the role of diet in coronary artery disease or with a higher interest in information about a healthy diet or a higher perceived expertise of the source or both.

Determinants of referral to certain nutrition information sources

What factors determine consumers' referral to individual nutrition information sources? This was also investigated with a univariate analysis (t test) and with a multivariate analysis (logistic regression) to correct for possible confounding factors. The variables of Table 3 were entered in both analyses as possible determinants. We will especially address the results of the sources with the highest referral score and the highest score on perceived expertise: PCP, dietitian, and FNEB.

TABLE 3
Multivariate analysis (logistic regression; left columns) and univariate analysis (*t* test; right columns) on the basis of factor analysis with referral to a certain nutrition information source or to a group of sources as the dependent variable[1]

Nutrition information source	Commercial sources (factor 1)		Noncommercial sources (factor 2)		Primary care physician		Dietitian		Food and Nutrition Education Bureau	
	OR	$P <$	OR	$P <$	OR	$P <$	OR	$P <$	OR	$P <$
Sex	—	0.05	—	0.05	—	0.05	—	0.05	—	—
Age	—	—	—	—	—	0.05	4.76	0.001	—	—
Level of education	—	0.05	—	—	—	0.05	0.50	0.05	2.61	0.001
Level of income	—	—	—	—	—	—	—	—	—	—
Children living at home	—	—	1.64	0.05	0.65	—	—	—	—	—
Number of self-cooked meals a week	—	0.01	—	0.001	—	0.01	—	0.001	—	—
Perceived general nutritional knowledge	—	0.01	—	0.001	—	—	—	0.01	4.66	0.001
Perceived importance of contribution of diet to health	—	0.05	—	0.05	—	—	—	—	—	0.001
Perceived wholesomeness of own diet	—	—	—	—	—	—	—	0.01	—	—
Attitude on role of diet in coronary artery disease	2.36	0.001	2.23	0.001	—	0.01	—	0.001	2.89	0.001
Attitude on weight-health relation	—	—	1.72	0.001	—	0.01	—	0.001	—	0.05
Interest in information on diet and health	6.23	0.001	5.37	0.001	3.63	0.001	6.82	0.001	8.67	0.001
Perceived expertise of the source	5.00	0.001	—	—	3.39	0.001	6.69	0.001	4.01	0.001

[1] Left column under each nutrition information source is logistic-regression analysis: $P \ll 0.05$. Figures are adjusted odds ratios $= e^x$, where $x =$ log (odds ratio) of variable, multiplied by (the number of categories of that variable minus 1). Right column under each nutrition information source is univariate analysis (*t* test).

Primary care physician

In the univariate analysis it was found (Table 3) that many variables act as determinants of referral to the PCP as a source of nutrition information. However, in the multivariate analysis, the PCP was referred to more by people without children living at home or with a higher interest in information about a healthy diet or a higher level of perceived expertise of the source.

Dietitian

In the univariate analysis it was again found (Table 3) that many variables act as determinants of referral to the dietitian as a source of nutrition information. Nevertheless, in the multivariate analysis the dietitian was referred to more by older people, those with a lower level of education, or those with a higher interest in information about a healthy diet or with a higher perceived expertise of the source or both (Table 3).

Food and Nutrition Education Bureau

In the univariate analysis it was also found (Table 3) that many variables act as determinants of referral to the FNEB. In the multivariate analysis, however, the FNEB was referred to more by people with a higher level of education, a higher perceived general nutritional knowledge, a more positive attitude on the role of diet in coronary artery disease, or a higher interest in information on a healthy diet or a higher perceived expertise of the source or both (Table 3).

PCP compared with dietitian and FNEB

When comparing the PCP as a source of nutrition information with his or her best competitors, the dietitian and the FNEB, it became clear that the PCP had the highest referral score and a slightly lower perceived expertise (Table 2). The next step was to take into account the determinants of referral to the three sources. When referral to a nutrition information source has only a minimal number of determinants, then this source will reach almost all segments of the population (segments with respect to the variables of Table 3). As tested with multivariate analysis, referral to these three sources (Table 3) was positively influenced by the variables "interest in information about a healthy diet" and "perceived expertise of the source." Six independent variables of Table 3 (sex, level of income, number of self-cooked meals a week, perceived importance of contribution of diet to health, perceived wholesomeness of own diet, and attitude on weight-health relation) did not influence referral to these three sources. Referral to the PCP had one additional determinant: people without children living at home referred to the PCP more often than did people with children living at home (This variable did not influence referral to the dietitian or the FNEB). Other variables did not influence referral to the PCP but did influence referral to the dietitian or the FNEB. Older people referred more to the dietitian than did younger people, whereas age did not influence referral to the FNEB. People with a higher level of education referred to the FNEB more than did people with a lower level of education, in contrast with the dietitian, for whom the situation was the opposite. People with a higher perceived general knowledge and people with a more positive attitude on the role of diet in coronary artery disease referred more often to the FNEB; these variables did not influence referral to the PCP or dietitian.

DISCUSSION

This study shows that consumers do prefer PCPs as a source of nutrition information over 10 other potential sources. The conclusion can be made that many more segments of the population (segments formed on the basis of the variables of Table 3) refer to PCPs than to dietitians or the FNEB, which emerge as PCPs' best competitors as sources of nutrition information. This conclusion can be reached on the basis of the following observations:

First, of all sources, the PCP is referred to by the highest percentage of respondents: 36%. Although friends and neighbors and family also have equally high referral scores, they are not comparable with the PCP because they cannot serve as an intermediary group to inform the consumer (19). This finding is in agreement with the literature (media not included in possible sources) (3, 20–23).

Second, the level of perceived expertise of the PCP is among the highest (Table 2). The dietitian and the FNEB have a slightly higher perceived expertise. In the literature, family doctors (3) and physicians (20) are reported as the most credible sources of nutrition information.

Third, the PCP is a member of the noncommercial group of nutrition information sources, as derived from factor analysis. The noncommercial sources are referred to more by the respondents than the commercial sources; as a group, noncommercial sources have a much higher level of perceived expertise.

Fourth, the decision of the consumer to refer to the PCP for nutrition information is strongly dependent on the consumer's interest in information about a healthy diet (66%), the consumer's perceived expertise of the source (which is among the highest), and whether the consumer has children living at home (Tables 2 and 3). The decision appears to be independent of the other variables given in Table 3, which makes us conclude that nearly all segments of the population are in principle reached by PCPs, which is not the case for dietitians or the FNEB.

Last, the high level of perceived expertise of the PCP as a nutrition information source is important from another point of view. We consistently found that respondents referring to a certain source had a significantly higher level of perceived expertise of that source than did respondents not referring to the same source. This also holds true for groups of sources (based on factor analysis), ie, the factors noncommercial sources and commercial sources. In addition, there was a significant individual Spearman correlation between referral score and perceived expertise of $\rho = 0.35 \pm 0.36$ ($\bar{x} \pm$ SD). Worsley (3) found a Pearson correlation of $r = 0.75$ between referral score per source and reliability of that source; we found a Spearman correlation of $\rho = 0.90$ between referral score per source and perceived expertise of that source.

The literature suggests that PCPs are not aware of the extent to which patients value lifestyle advice (11) and that they also underestimate patients' interest in receiving health education (12). In patients' opinions, PCPs should show more interest in their lifestyle (13, 14). Although our results show clearly that consumers do prefer the PCP as a source of nutrition information above other sources, we have the strong impression that PCPs are not aware of this given position and expectations by consumers, who are their patients.

In a recent study by the Dutch College of General Practitioners, in which a random sample of general practitioners and a representative sample of the Dutch population were interviewed, it was found that both general practitioners and the general public agreed in large part on the necessity of adequate health information and education in medical practice (24, 25). Ensuring the provision of adequate nutrition guidance to patients by PCPs could be one of the steps to improve this situation. PCPs may have misperceptions of consumers' interest in nutrition and consumers may have misperceptions of what PCPs can do for them. Improving the nutrition knowledge of PCPs seems to be a topic that still needs attention because PCPs view this as a deficit to getting actively involved in nutrition guidance of patients (26, 27). Improved nutrition knowledge eventually would lead to a higher self-efficacy of PCPs (28, 29) and possibly also to a change in their perceived role in giving nutrition information to patients (the consumer). On the other hand, it seems fair not to overlook the possibility that patients may have unrealistically high expectations of PCPs. In such a complex situation, good communication between the PCP and patient becomes even more important. Are PCPs and patients really aware of the need for good communication in daily practice and do they have the skills to apply such communication? Nevertheless, from the point of view of health promotion planning (30), our results concerning the conditions for nutrition information of patients (consumers) by PCPs must be considered as positive and encouraging.

Our findings regarding determinants of referral to nutrition information sources seem to be in contrast with findings reported in the literature with respect to sex and age (3, 20–22), income (21, 22), nutrition knowledge (23), level of education (3, 22), and whether there are children living at home (3). We think this is because all of the authors except Worsley (3) based their conclusions on univariate analysis (20–23), whereas we also performed a multivariate analysis, logistic-regression analysis, which intrinsically corrects for confounding factors.

In conclusion, because of their high referral score, their relatively high perceived expertise, and their reach to nearly all segments of the population, PCPs are in a unique position over 10 other analyzed sources (including dietitians and the FNEB) as potential providers of nutrition information.

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